REMARKS

In paragraphs 1 and 2 of the Office Action claim 11-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chang et al 6,069,775 and Sasaki 6,154,347, stating:

> "Regarding Claim(s) 11, Chang discloses a method for fabricating a magnetic head comprising: fabricating a read head upon a substrate (see Fig. 22); fabricating a P1 pole (318 in Fig. 32) upon the read head; fabricating a write gap layer 334 upon the P1 pole; fabricating a block of material (photoresist 368) upon the write gap layer, the block of material having a sidewall disposed proximate a P2 pole tip location (see Fig. 36); fabricating a seed layer 366 upon the sidewall; electroplating a P2 pole tip material 342 upon the seed layer, whereby a P2 pole tip 342 is formed having a width W that is comprised of a thickness of the seed layer material and a thickness of the electroplated material (see Fig. 39); fabricating an induction coil proximate the P2 pole tip (see Fig. 34).
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> Regarding Claim(s) 17, Chang further teaches that the P2 pole tip is fabricated within a P2 pole tip trench (opening in photoresist 368 shown in Fig. 36 not labeled) having a width that is slightly wider that the width of the P2 pole tip. The P2 pole tip trench is slightly wider in width than the P2 pole tip to the extent that the material of the P2 pole tip is formed within the P2 pole tip trench.
>
> Chang does not teach fabricating a P3 pole above the induction coil in magnetic interconnection with the P2 pole tip and fabricating an encapsulating layer above the P3 pole (as required in the last 3 lines of Claim 11).
>
> Sasaki teaches that a combination MR read head that is merged with a write head to form an overall magnetic head can include fabricating a P3 pole above the induction coil and fabricating an encapsulating layer above the P3 pole. Both of the magnetic head devices of Chang and Sasaki achieve the very same performance characteristics of reading and writing information to a recording medium. The advantage of the manufacturing process of Sasaki, including the additional P3 pole and encapsulating layer, is to improve the balance between the performance of the read head and the performance of the write head (see col. 2, lines 5-12).
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> It would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the method of Chang by including the P3 pole and encapsulating layer, as taught by Sasaki, to positively improve the balance between the performance of the read head and the performance of the write head.
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> Regarding Claim(s) 12-15 as to the specific thicknesses, or range of thicknesses, of the seed layer and the electroplated material recited in Claims 12-15 are each considered to be an effective variable within the level of ordinary skill in the art of manufacturing magnetic heads with seed layers and electroplated materials. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have provided the specific range of thicknesses for the seed layer and the electroplated material (as recited in each of Claims 12-15), since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In ***re Boesch,*** 617 F.2d 272, 205

USPQ 215 (CCPA 1980). Furthermore, the specific thicknesses of the seed layer and the electroplated material appear to have no impact on the manufacturing method, particularly when compared to the prior art manufacturing methods of both Chang et al and Sasaki. "

Applicant respectfully traverses this ground of rejection and asserts that the claims recite subject matter that is neither taught by nor obvious from the cited prior art. As is discussed below, the prior art (particularly Chang '775) fails to teach or render obvious a seed layer that is fabricated upon the sidewall of the block of materials.

With regard to independent claim 11, it teaches the relevant limitations of:

"fabricating a block of material upon said write gap layer, said block of material having a sidewall disposed proximate a P2 pole tip location;
fabricating a seed layer upon said sidewall;
electroplating P2 pole tip material upon said seed layer," Emphasis added.

In the rejection quoted above, Chang '775 is indicated to teach such a seed layer structure, and Applicant traverses this assertion. Particularly, the rejection states in pertinent part:

"fabricating a read head upon a substrate (see Fig. 22); fabricating a P1 pole (318 in Fig. 32) upon the read head; fabricating a write gap layer 334 upon the P1 pole; fabricating a block of material (photoresist 368) upon the write gap layer, the block of material having a sidewall disposed proximate a P2 pole tip location (see Fig. 36); fabricating a seed layer 366 upon the sidewall; electroplating a P2 pole tip material 342 upon the seed layer." Emphasis added.

This rejection fails to specifically identify the "sidewall" of Chang's block of material (photoresist 368). In attempting to apply the teachings of Chang '775 to the present invention, it is assumed that the sides (unnumbered) of the pole tip trench (unnumbered) of Chang's photoresist material 368 must be such a sidewall. Significantly, Chang '775 fails to teach the fabrication of a seed layer upon said sidewall, as set forth in claim 11. Rather, Chang teaches away from such a structure; that is, Chang teaches first depositing a seed layer 366 upon which the block of material (photoresist 368) is then fabricated.

In this regard, Chang '775 teaches the typical prior art pole tip electroplating method, wherein a seed layer 366 is first deposited, a patterned photoresist is then fabricated to create a

pole tip trench, and the pole tip is electroplated upwards from the seed layer at the bottom of the trench to fill the trench. As described in Applicant's specification, in Applicant's invention the pole tip is fabricated sideways from the side of the trench because the seed layer is fabricated upon a sidewall of the trench, and the electroplated pole tip does not fill the trench (see for instance Fig. 7 of the specification).

There is no further teaching within Chang '775 regarding the fabrication of a seed layer upon a sidewall of a block of material. Regarding Sasaki '347, it is cited for its teachings of the encapsulation of the magnetic head structures. A review of Sasaki '347 reveals that it teaches nothing with regard to the fabrication of a seed layer upon a sidewall of a block of material for creating a pole tip structure. Applicant therefore respectfully submits that the combination of the teachings of Sasaki '347 with Chang '775 fails to teach or render obvious Applicant's claimed seed layer covered sidewall pole tip fabrication method.

A further limitation of independent claim 11 that is neither taught by nor obvious from the cited prior art is the dual composition width pole tip limitation in claim 11, stating:

> "whereby a P2 pole tip is formed having a width W that is comprised of a thickness of said seed layer material and a thickness of said electroplated material." Emphasis added

In the Office Action rejection it is stated that:

> "whereby a P2 pole tip 342 is formed having a width W that is comprised of a thickness of the seed layer material and a thickness of the electroplated material (see Fig. 39);"

Applicant traverses this ground of rejection. Particularly, Fig. 39 of Chang '775 depicts a pole tip in which a lower portion of its thickness (not its width) is composed of a seed layer and the upper part of its thickness is comprised of electroplated material. Applicant's claim limitation, as depicted in Fig. 11, composed pole tip 80 having a width W which is comprised of a thickness of seed layer material 54 and a thickness of

electroplated material 88. Applicant therefore respectfully submits that Chang '775 fails to teach this limitation of independent claim 11. The teachings of Sasaki '347 add nothing in this regard, whereby Applicant asserts that the combined teachings of Chang and Sasaki fail to render obvious Applicant's claimed pole tip structure.

Regarding rejected dependent claims 12-15, Applicant submits that these claims recite limitations that are neither taught by nor obvious from the cited prior art, and additionally that these claims are allowable in that they depend either directly or indirectly from allowable independent base claim 11.

Regarding claim 16, it recites the limitation that the pole tip fabrication trench has a width that is wider than the width of the pole tip that is fabricated within the trench. With regard to dependent claim 16, the Office Action rejection states:

> "Regarding Claim(s) 17, Chang further teaches that the P2 pole tip is fabricated within a P2 pole tip trench (opening in photoresist 368 shown in Fig. 36 not labeled) having a width that is slightly wider that the width of the P2 pole tip. The P2 pole tip trench is slightly wider in width than the P2 pole tip to the extent that the material of the P2 pole tip is formed within the P2 pole tip trench."

Initially, Applicant believes that this above quoted rejection paragraph is directed to claim 16, rather than claim 17 as stated. Applicant respectfully traverses this ground of rejection as there is no teaching in Chang '775 (as asserted in the rejection) that the "The P2 pole tip trench is slightly wider in width than the P2 pole tip to the extent that the material of the P2 pole tip is formed within the P2 pole tip trench." Applicant fails to understand this assertion; rather Applicant asserts that a pole tip that is electroplated from the bottom seed layer of a photoresist trench (Chang '775) is generally thought to have the same width as the width of the trench. If the rejection seeks to assert that at some atomic or molecular level that Chang's pole tip is infinitesimally less wide than the pole tip trench in which it is fabricated, there is no teaching

within Chang '775 to support this assertion. Applicant therefore respectfully submits that dependent claim 16 recites subject matter that is neither taught by nor obvious from the cited prior art. Additionally, Applicant asserts that claim 16 is allowable in that it depends from allowable base independent claim 11.

In paragraph 3 of the Office Action claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chang et al and Sasaki, as applied to claim 11 above, and further in view of Koshikawa et al 6,199,267, stating:

> "Chang, as modified by Sasaki, teaches the claimed manufacturing method as relied upon above in Claim 11, further including that the block of material (photoresist 368 in Chang) is removed from the write gap layer following the electroplating of the P2 pole tip material. The modified Chang method does not teach that the PI pole is notched in an ion milling step.
>
> Koshikawa teaches an ion milling step of notching a P1 pole tip 7 (shown in Fig. 2D and 2E) to provide alignment of the P1 pole tip with the P2 pole tip and an accurate track width (see col. 2, lines 38-41).
>
> It would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the method of Chang by including the ion milling step of Koshikawa, to advantageously allow alignment of the P1 pole tip with the P2 pole tip and provide an accurate track width."

Responsive hereto, Applicant asserts that dependent claim 17 is allowable in that it depends from an allowable base claim, independent claim 11.

In paragraph 4 of the Office Action claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chang et al in view of Sasaki, as applied to claims 11 and 14 above, and further in view of Tran 5,875,542, stating:

> "Chang, as modified by Sasaki, teaches the claimed manufacturing method as relied upon above in Claims 11 and 14. The modified Chang method does not mention what material composition is made up of both the seed layer and the P2 pole tip.
>
> However, Tran teaches that a seed layer 47 (in Fig. 3C) and a P2 pole tip 48 can each be made up of NiFe (see col. 3, lines 3-7).
>
> It would have been obvious to one of ordinary skill in the art at the time

> the invention was made to have modified the materials of the seed layer and P2 pole tip of Chang by forming each with NiFe, as taught by Tran, to produce art recognized equivalent magnetic heads that perform the same characteristics of reading and writing information to a recording medium."

Responsive hereto, Applicant asserts that dependent claim 18 is allowable in that it indirectly depends from an allowable base claim, independent claim 11.

In this Amendment, Applicant has added new claim 19 which depends from independent claim 11. Referring to the application, and particularly Figs. 2 and 3, it is seen that the block of material 40 includes a sidewall 44 which comprises a surface that is perpendicular to the write gap layer 34. Seed layer 54 is deposited upon the sidewall 44. Applicant respectfully submits that such a perpendicular sidewall (having a seed layer fabricated thereon) is neither taught by nor obvious from the cited prior art. Applicant therefore respectfully submits that new claim 19 which is dependent from independent claim 11, recites patentable subject matter.

Having responded to all of the paragraphs of the Office Action, and having amended the claims accordingly, Applicant respectfully submits that the Application is now in condition for allowance. Applicant therefore respectfully requests that a Notice of Allowance be forthcoming

at the Examiner's earliest opportunity. Should the Examiner have any questions or comments with regard to this amendment, a telephonic conference at the number set forth below is respectfully requested.

Respectfully submitted,

Dated: March 30, 2006

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CERTIFICATE OF MAILING (37 CFR 1.8(a))

I hereby certify that this paper (along with any referred to as being attached or enclosed) is being deposited on March 30, 2006 with the U.S. Postal Service as first class mail in an envelope addressed to: MS Amendment, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.
Date: March 30, 2006

Patricia Beilmann